

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

--	--	--	--	--	--	--	--	--	--

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

BFN2094 – CORPORATE RISK MANAGEMENT

(All sections / Groups)

13th MARCH 2020
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of SIX (6) printed pages with four (4) questions and financial tables only excluding the cover page.
2. Attempt ALL questions.
3. Please write all your answer in the **Answer Booklet** provided.
4. Marks are shown at the end of each question.

There are **FOUR (4)** questions in this section. Answer **ALL** questions.

Question 1 (25 Marks)

- (a) Duduk Bhd is a manufacturer of childcare safety products, primarily car seats and strollers. The products are sold directly to the independent retailers in South East Asia. The company's risk manager knows that the company could be sued if a car seat or a stroller is defective, and someone injured. Because the cost of products liability insurance has increased, the risk manager's is considering other techniques to treat the company's loss exposures.

- i. Describe the four steps in the risk management process.

(8 marks)

- ii. List and recommend two (2) major risk-control techniques and examples that Duduk Bhd. can apply for reducing the frequency or severity of losses due to potential product defects.

(10 marks)

- (b) Explain the difference between *pure risk* and *speculative risk*.

(3 marks)

- (c) How does *diversifiable risk* differ from the *nondiversifiable risk*?

(4 marks)

Continued...

Question 2 (25 Marks)

(a) Private insurers provide social and economic benefits to society. Explain the following benefits of insurance to society.

i. Indemnification for loss

(3 marks)

ii. Enhancement of credit

(3 marks)

iii. Source of funds for capital investment and accumulation

(3 marks)

(b) Explain the two (2) major costs of insurance to society.

(4 marks)

(c) Camila and Shawn enter into a pooling arrangement for accidental losses. Assume that their losses are independent of each other and have the following distribution:

Possible outcomes (x_i)	Probability (p_i)
RM 0	0.945
RM 500	0.05
RM 1,000	0.0045
RM 5,000	0.0005

i. Compute the expected loss before risk pooling.

(4 marks)

ii. Prepare a probability distribution table after the risk pooling.

(8 marks)

Continued...

Question 3 (25 Marks)

- (a) A firm incurred the following insured losses, in the order given, during the current policy year.

Loss	Amount of Loss (RM)
A	2500
B	3500
C	10,000

How much would the company's insurer pay for each loss if the policy contained the following type of deductible?

- i. RM10,000 straight deductible.

(6 marks)

- ii. RM15,000 annual aggregate deductible.

(9 marks)

- (b) Sulaiman, age 25, is considering the purchase of a RM20,000 participating ordinary life insurance policy. The annual premium is RM248.60. Projected dividends over the first 20 years are RM814. The cash value at the end of 20 years is RM4314. If the premiums are invested at 5% interest, they will accumulate to RM8631 at the end of 20 years. If the dividends are invested at 5% interest, they will accumulate to RM1163 at the end of 20 years. A RM1 deposit at the beginning of each year at 5% interest will accumulate to RM34.72 at the end of 20 years.

- i. Based on the *traditional net cost method*, calculate the cost per RM1000 per year.

(5 marks)

- ii. Based on the *surrender cost index*, calculate the cost per RM1000 per year.

(5 marks)

Continued...

Question 4 (25 Marks)

- (a) List the major advantage and disadvantage of purchasing an insurance policy on aggregate property and liability losses versus purchasing a separate property insurance policy and a separate liability insurance policy.
- (4 marks)
- (b) Suppose Cerdik Bhd. is considering spending RM10 million this year to improve the safety of its manufacturing facilities. It estimates that the annual frequency of accidents per employee will fall from 5% to 4% and that the average severity of accidents will fall from RM20,000 to RM15,000 per year as a result of the renovation in each of the next 9 years. Assuming a constant workforce of 5,000 employees over this time, should the firm spend the RM10 million if the required return is 7%?
- (13 marks)
- (c) Fatimah owns a jewellery shop in a high crime area. The store does not have a camera surveillance system. The high cost of burglary and theft insurance has substantially reduced her profits. A risk management consultant points out that several methods other than insurance can be used to handle the burglary and theft exposure. Identify and explain two (2) *noninsurance* methods that could be used to deal with the burglary and theft exposure.

(8 marks)

End of Page

Present Value and Future Value Tables

Table A-1 Future Value Interest Factors for One Dollar Compounded at k Percent for n Periods: $FVIF_{k,n} = (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.2000	1.2400	1.2500	1.3000
2	1.0201	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664	1.1881	1.2100	1.2321	1.2544	1.2769	1.2996	1.3225	1.3456	1.4400	1.5376	1.5625	1.6900
3	1.0303	1.0612	1.0927	1.1249	1.1576	1.1910	1.2250	1.2597	1.2950	1.3310	1.3676	1.4049	1.4429	1.4815	1.5209	1.5609	1.7280	1.9066	1.9531	2.1970
4	1.0406	1.0824	1.1255	1.1699	1.2155	1.2625	1.3108	1.3605	1.4116	1.4641	1.5181	1.5735	1.6305	1.6890	1.7490	1.8106	2.0736	2.3642	2.4414	2.8561
5	1.0510	1.1041	1.1593	1.2167	1.2763	1.3382	1.4026	1.4693	1.5386	1.6105	1.6851	1.7623	1.8424	1.9254	2.0114	2.1003	2.4883	2.9316	3.0518	3.7129
6	1.0615	1.1262	1.1941	1.2653	1.3401	1.4185	1.5007	1.5869	1.6771	1.7716	1.8704	1.9738	2.0820	2.1950	2.3131	2.4364	2.9860	3.6352	3.8147	4.8268
7	1.0721	1.1487	1.2299	1.3169	1.4071	1.5016	1.6007	1.7043	1.8126	1.9257	2.0438	2.1670	2.2954	2.4290	2.5680	2.7124	3.4000	4.2532	4.5077	6.2749
8	1.0829	1.1717	1.2668	1.3686	1.4775	1.5939	1.7182	1.8509	1.9926	2.1436	2.3045	2.4760	2.6584	2.8526	3.0590	3.2784	4.2998	5.5895	5.9605	9.1573
9	1.0937	1.1951	1.3048	1.4233	1.5513	1.6895	1.8385	1.9990	2.1719	2.3579	2.5580	2.7731	3.0040	3.2519	3.5179	3.8030	5.1598	6.9310	7.4506	10.604
10	1.1046	1.2190	1.3439	1.4802	1.6289	1.7908	1.9672	2.1589	2.3674	2.5937	2.8394	3.1058	3.3946	3.7072	4.0466	4.4144	6.1917	8.5944	9.3132	13.786
11	1.1157	1.2434	1.3842	1.5395	1.7103	1.8983	2.1049	2.3316	2.5804	2.8531	3.1518	3.4785	3.8359	4.2262	4.6524	5.1173	7.4301	10.657	11.642	17.922
12	1.1269	1.2682	1.4258	1.6010	1.7959	2.0122	2.2522	2.5182	2.8127	3.1384	3.4985	3.8960	4.3345	4.8179	5.3503	5.9360	8.9161	13.215	14.652	23.298
13	1.1381	1.2936	1.4685	1.6651	1.8856	2.1329	2.4098	2.7196	3.0658	3.4523	3.8833	4.3635	4.8980	5.4924	6.1528	6.8858	10.699	16.386	18.190	30.288
14	1.1495	1.3195	1.5126	1.7317	1.9789	2.2609	2.5785	2.9372	3.3417	3.7975	4.3104	4.8871	5.5348	6.2613	7.0757	7.9875	12.839	20.318	22.737	39.374
15	1.1610	1.3459	1.5580	1.8009	2.0789	2.3966	2.7590	3.1722	3.6425	4.1772	4.7846	5.4736	6.2543	7.1379	8.1371	9.2655	15.407	25.196	28.422	51.186
16	1.1726	1.3728	1.6047	1.8730	2.1829	2.5404	2.9522	3.4269	3.9703	4.5950	5.3109	6.1304	7.0673	8.1372	9.3576	10.748	18.488	31.243	35.527	66.542
17	1.1843	1.4002	1.6528	1.9479	2.2920	2.6928	3.1588	3.7000	4.3276	5.0546	5.8951	6.8660	7.9861	9.2765	10.761	12.468	22.186	38.741	44.409	86.504
18	1.1961	1.4282	1.7024	2.0258	2.4066	2.8543	3.3799	3.9960	4.7171	5.5599	6.5436	7.6900	9.0243	10.575	12.375	14.463	26.623	48.039	55.511	112.455
19	1.2081	1.4568	1.7535	2.1068	2.5270	3.0256	3.6168	4.3157	5.1417	6.1169	7.2633	8.6128	10.197	12.056	14.232	16.777	31.948	59.568	69.389	146.192
20	1.2202	1.4859	1.8081	2.1911	2.6533	3.2071	3.8697	4.6610	5.6044	6.7275	8.0623	9.6483	11.523	13.743	16.367	19.461	38.338	73.864	86.736	190.050
21	1.2324	1.5157	1.8603	2.2788	2.7860	3.3996	4.1406	5.0338	6.1088	7.4002	8.9492	10.804	13.021	15.668	18.822	22.574	46.005	91.592	108.420	247.068
22	1.2447	1.5460	1.9181	2.3699	2.9253	3.6035	4.4304	5.4385	6.6586	8.1403	9.9336	12.100	14.714	17.861	21.645	26.186	55.208	113.574	135.525	321.184
23	1.2572	1.5769	1.9736	2.4647	3.0715	3.8197	4.7405	5.8715	7.2579	8.8843	11.026	13.552	16.827	20.362	24.881	30.376	68.247	140.831	169.407	417.539
24	1.2697	1.6084	2.0328	2.5633	3.2251	4.0489	5.0724	6.3412	7.9111	9.8497	12.239	15.179	18.788	23.212	28.625	35.236	79.497	174.631	211.758	542.801
25	1.2824	1.6405	2.0938	2.6658	3.3864	4.2919	5.4274	6.8485	8.6231	10.835	13.585	17.000	21.231	26.462	32.919	40.874	95.396	216.542	264.898	705.641
30	1.3478	1.8114	2.4273	3.2434	4.3219	5.7435	7.6123	10.063	13.268	17.449	22.892	29.980	39.116	50.950	66.212	85.850	237.378	634.820	807.784	*
35	1.4168	1.9999	2.8139	3.9461	5.5160	7.6881	10.677	14.786	20.414	28.102	38.575	52.800	72.069	98.100	133.176	180.314	690.668	*	*	*
40	1.6308	2.0399	2.8983	4.1039	5.7918	8.1473	11.424	16.968	22.251	30.913	42.818	59.136	81.437	111.834	153.152	209.164	708.802	*	*	*
45	1.8589	2.2080	3.2620	4.8010	7.0400	10.286	14.974	21.725	31.409	45.259	66.001	93.051	132.782	188.884	267.864	378.721	*	*	*	*
50	1.8446	2.6916	4.3839	7.1067	11.467	18.420	29.457	46.902	74.358	117.391	184.565	288.002	450.736	700.233	*	*	*	*	*	*

Table A-2 Future Value Interest Factors for a One-Dollar Annuity Compounded at k Percent for n Periods: $FVIFA_{k,n} = [(1 + k)^n - 1] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	1.0090	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.2000	1.2400	1.2500	1.3000
2	2.0100	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1100	2.1200	2.1300	2.1400	2.1500	2.1600	2.2000	2.2400	2.2500	2.3000
3	3.0301	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3421	3.3744	3.4069	3.4396	3.4725	3.5056	3.6400	3.7778	3.8125	3.9900
4	4.0604	4.1216	4.1835	4.2465	4.3101	4.3744	4.4399	4.5061	4.5731	4.6410	4.7097	4.7793	4.8498	4.9211	4.9934	5.0665	5.3680	5.6842	5.7666	6.1870
5	5.1010	5.2040	5.3091	5.4163	5.5255	5.6371	5.7507	5.8666	5.9847	6.1051	6.2278	6.3528	6.4803	6.6101	6.7424	6.8771	7.4416	8.0484	8.2070	9.0431
6	6.1620	6.3081	6.4584	6.6130	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	7.9129	8.1152	8.3227	8.5355	8.7537	8.9775	9.9299	10.980	11.259	12.756
7	7.2135	7.4343	7.6623	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	9.7833	10.089	10.405	10.730	11.067	11.414	12.915	14.815	15.073	17.583
8	8.2857	8.5830	8.8923	9.2142	9.5491	9.8975	10.260	10.638	11.028	11.438	11.859	12.300	12.767	13.233	13.727	14.240	16.499	19.123	19.842	23.858
9	9.3685	9.7646	10.169	10.593	11.027	11.491	11.978	12.488	13.021	13.579	14.164	14.776	15.416	16.085	16.786	17.519	20.799	24.712	25.802	32.015
10	10.482	10.950	11.464	12.006	12.578	13.181	13.815	14.487	15.193	15.937	16.722	17.549	18.420	19.337	20.304	21.321	25.959	31.643	33.253	42.819
11	11.567	12.169	12.808	13.486	14.207	14.972	15.784	16.645	17.560	18.531	19.561	20.655	21.814	23.045	24.349	25.733	32.150	40.239	42.566	56.405
12	12.693	13.412	14.192	15.026	15.917	16.870	17.888	18.977	20.141	21.384	22.713	24.133	25.650	27.271	29.002	30.850	39.581	50.895	54.208	74.327
13	13.869	14.680	15.618	16.627	17.713	18.882	20.141	21.495	22.953	24.523	26.212	28.029	29.985	32.089	34.362	36.786	48.497	64.110	68.760	97.625
14	14.947	15.974	17.086	18.292	19.599	21.015	22.550	24.215	26.019	27.975	30.095	32.383	34.863	37.581	40.505	43.672	59.196	80.495	86.949	127.813
15	16.097	17.293	18.599	20.024	21.579	23.276	25.129	27.162	29.361	31.772	34.405	37.280	40.417	43.842	47.580	51.660	72.035	100.816	109.687	167.28
16	17.258	18.639	20.157	21.825	23.657	25.673	27.888	30.324	33.003	35.850	38.910	42.783	46.672	50.890	55.717	60.925	87.442	126.011	138.109	218.472
17	18.439	20.012	21.762	23.698	25.840	28.213	30.840	33.750	36.974	40.545	44.501	48.884	53.739	59.118	65.075	71.673	105.931	157.253	173.636	285.014
18	19.615	21.412	23.414	25.645	28.132	30.905	33.999	37.450	41.301	45.599	50.396	55.750	61.725	68.394	75.836	84.141	128.117	195.994	218.045	371.516
19	20.811	22.841	25.117	27.671	30.539	33.780	37.379	41.446	46.018	51.159	56.939	63.440	70.749	78.969	88.212	98.603	154.740	244.033	273.556	483.973
20	22.019	24.297	26.870	29.778	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052	80.947	91.025	102.444	115.380	186.688	303.601	342.945	630.165
21	23.239	25.783	28.676	31.969	35.719	39.953	44.665	50.023	56.055	62.875	71.403	81.214	92.503	105.491	120.436	137.632	217.451	377.655	429.581	820.215
22	24.472	27.299	30.537	34.248	38.505	43.392	49.006	55.457	62.873	71.403	81.214	92.503	105.491	120.436	137.632	157.415	271.031	469.056	538.101	"
23	25.716	28.845	32.453	36.618	41.430	46.996	53.406	60.893	69.532	79.543	91.148	104.603	120.205	138.297	159.276	183.601	326.237	582.630	673.626	"
24	26.973	30.422	34.426	39.083	44.502	50.816	58.177	66.765	76.790	88.497	102.174	118.155	136.831	158.659	184.168	213.978	392.484	723.461	843.033	"
25	28.243	32.036	36.459	41.646	47.727	54.866	63.249	73.106	84.701	98.347	114.413	133.334	155.620	181.871	212.793	249.214	471.981	898.092	"	"
30	34.785	40.568	47.575	56.085	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333	293.199	358.577	434.745	530.312	"	"	"	"
35	41.660	49.994	60.482	73.652	90.320	111.435	138.237	172.317	215.711	271.024	341.590	431.663	546.681	695.783	881.170	"	"	"	"	"
36	43.077	51.994	63.276	77.598	95.836	119.121	148.913	187.102	236.125	299.127	380.164	484.463	618.749	791.673	"	"	"	"	"	"
40	48.886	60.402	75.401	95.026	120.800	154.762	199.635	259.057	337.882	442.593	581.826	767.091	"	"	"	"	"	"	"	"
50	64.863	84.579	112.797	152.667	209.348	290.336	408.529	573.770	816.084	"	"	"	"	"	"	"	"	"	"	"

Present Value and Future Value Tables

Table A-3 Present Value Interest Factors for One Dollar Discounted at k Percent for n Periods: $PVIF_{k,n} = 1 / (1 + k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2781	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2282	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2384	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5124	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4165	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3295	0.2768	0.2317	0.1945	0.1638	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0686	0.0569	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3891	0.3101	0.2470	0.1971	0.1577	0.1264	0.1016	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4775	0.3751	0.2953	0.2330	0.1842	0.1450	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5821	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0258	0.0195	0.0151	0.0116	0.0042	0.0016	0.0012	*
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	*	*	*
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0688	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	*	*	*	*

Table A-4 Present Value Interest Factors for a One-Dollar Annuity Discounted at k Percent for n Periods: $PVIFA = [1 - 1/(1 + k)^n] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3809
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1085	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3285	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7464	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0767	4.9173	4.7666	4.6228	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0187	6.7327	6.4632	6.2098	5.9713	5.7468	5.5349	5.3349	5.1461	4.9675	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5162	6.2469	5.9952	5.7580	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0235	6.7101	6.4177	6.1446	5.8902	5.6502	5.4262	5.2161	5.0186	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.3688	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2088	5.9377	5.6899	5.4627	5.2337	5.0286	4.3271	3.7757	3.6584	3.1473
12	11.2555	10.6755	10.1440	9.6451	9.1783	8.7427	8.3361	7.9507	7.5937	7.2644	6.9603	6.6784	6.4176	6.1769	5.9552	5.7515	5.0492	4.4978	4.3705	3.8593
13	12.1344	11.3488	10.6355	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.0044	12.1066	11.2956	10.5633	9.8986	9.2850	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6108	3.9616	3.8241	3.2487
15	13.8655	12.8499	11.9338	11.1118	10.3860	9.7122	9.1079	8.5595	8.0507	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5785	4.6755	4.0013	3.8593	3.2682
16	14.7178	13.5758	12.5561	11.6522	10.8338	10.1068	9.4468	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.5622	14.2922	13.1666	12.1666	11.2744	10.4777	9.7632	9.1216	8.5436	8.0216	7.5488	7.1198	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.3988	14.9922	13.7554	12.6559	11.6900	10.8228	10.0599	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.2288	15.6778	14.3224	13.1334	12.0855	11.1558	10.3338	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.0466	16.3551	14.8777	13.5990	12.4622	11.4700	10.5994	9.8181	9.1265	8.5138	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.8557	17.0111	15.4515	14.0299	12.8221	11.7654	10.8336	10.0117	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.6600	17.6688	16.0444	14.5511	13.3163	12.2404	11.3001	10.4001	9.6444	8.9715	8.3755	7.8440	7.3659	6.9389	6.5504	6.1982	5.1492	4.4004	4.2400	3.5950
23	20.4555	18.2922	16.4444	14.8555	13.4889	12.3303	11.2722	10.3719	9.5802	8.8832	8.2664	7.7184	7.2287	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.2433	18.9144	16.9366	15.2477	13.7999	12.5550	11.4669	10.5229	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.0233	19.5233	17.4133	15.6222	14.0994	12.7833	11.6554	10.6755	9.8225	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
26	22.7955	20.1255	18.0055	16.1111	14.5555	13.2222	12.0889	11.1000	10.2444	9.4777	8.7999	8.2500	7.7100	7.2500	6.8200	6.4300	5.2500	4.4444	4.2889	3.6333
27	23.5611	20.7222	18.5922	16.6111	15.0555	13.7222	12.5889	11.5889	10.7111	9.9111	9.2000	8.6200	8.0500	7.5500	7.1000	6.6800	5.4500	4.6444	4.4889	3.8333
28	24.3222	21.3166	19.1818	17.1111	15.5555	14.2222	13.0889	12.0889	11.2000	10.3777	9.6444	9.0300	8.4300	7.8900	7.4100	6.9600	5.6500	4.8444	4.6889	4.0333
29	25.0777	21.9099	19.7727	17.6111	16.0555	14.7222	13.5889	12.5889	11.6889	10.8444	10.0999	9.4500	8.8200	8.2500	7.7300	7.2400	5.8500	5.0444	4.8889	4.2333
30	25.8222	22.5000	20.3636	18.1111	16.5555	15.2222	14.0889	13.0889	12.1889	11.3333	10.5555	9.8889	9.2500	8.6500	8.1000	7.5800	6.1500	5.3444	5.1889	4.5333
31	26.5666	23.0888	20.9545	18.6111	17.0555	15.7222	14.5889	13.5889	12.6889	11.8333	11.0333	10.3333	9.7000	9.0800	8.5000	7.9400	6.4500	5.6444	5.4889	4.8333
32	27.3099	23.6777	21.5454	19.1111	17.5555	16.2222	15.0889	14.0889	13.1889	12.3333	11.5333	10.7777	10.1000	9.4500	8.8500	8.2600	6.7500	5.8444	5.6333	5.0333
33	28.0500	24.2666	22.1363	19.6111	18.0555	16.7222	15.5889	14.5889	13.6889	12.8333	12.0333	11.2222	10.5000	9.8000	9.1800	8.5600	7.0500	6.0444	5.8889	5.2333
34	28.7888	24.8555	22.7272	20.1111	18.5555	17.2222	16.0889	15.0889	14.1889	13.3333	12.5333	11.6666	10.8889	10.1500	9.5000	8.8500	7.3500	6.2444	6.0333	5.4333
35	29.5222	25.4444	23.3181	20.6111	19.0555	17.7222	16.5889	15.5889	14.6889	13.8333	13.0333	12.1666	11.3333	10.5500	9.8500	9.1800	7.5500	6.4444	6.2889	5.6333
36	30.2555	26.0333	23.9090	21.1111	19.5555	18.2222	17.0889	16.0889	15.1889	14.3333	13.5333	12.6666	11.8333	10.9500	10.2000	9.5000	7.7500	6.6444	6.4889	5.8333
37	31.0000	26.6222	24.5000	21.6111	20.0555	18.7222	17.5889	16.5889	15.6889	14.8333	14.0333	13.1666	12.3333	11.4500	10.6500	9.9000	8.0500	6.8444	6.6889	6.0333
38	31.7333	27.2111	25.0909	22.1111	20.5555	19.2222	18.0889	17.0889	16.1889	15.3333	14.5333	13.6666	12.8333	11.9500	11.1000	10.3500	8.2500	7.0444	6.8889	6.2333
39	32.4666	27.8000	25.6818	22.6111	21.0555	19.7222	18.5889	17.5889	16.6889	15.8333	15.0333	14.1666	13.3333	12.4500	11.6000	10.8000	8.4500	7.2444	7.0889	6.4333
40	33.2000	28.3888	26.2727	23.1111	21.5555	20.2222	19.0889	18.0889	17.1889	16.3333	15.5333	14.6666	13.8333	12.9500	12.1000	11.3000	8.6500	7.4444	7.2889	6.6333
41	33.9333	28.9777	26.8636	23.6111	22.0555	20.7222	19.5889	18.5889	17.6889	16.8333	16.0333	15.1666	14.3333	13.4500	12.6000	11.8000	8.8500	7.6444	7.4889	6.8333
42	34.6666	29.5666	27.4545	24.1111	22.5555	21.2222	20.0889	19.0889	18.1889	17.3333	16.5333	15.6666	14.8333	13.9500	13.1000	12.3000	9.0500	7.8444	7.6889	7.0333
43	35.4000	30.1555	28.0454	24.6111	23.0555	21.7222	20.5889	19.5889	18.6889	17.8333	17.0333	16.1666	15.3333	14.4500	13.6000	12.8000	9.2500	8.0444	7.8889	7.2333
44	36.1333	30.7444	28.6363	25.1111	23.5555	22.2222	21.0889	20.0889	19.1889	18.3333	17.5333	16.6666	15.8333	14.9500	14.1000	13.3000	9.4500	8.2444	8.0889	7.4333
45	36.8666	31.3333	29.2272	25.6111	24.0555	22.7222	21.5889	20.5889	19.6889	18.8333	18.0333	17.1666	16.3333	15.4500	14.6000	13.8000	9.6500	8.4444	8.2889	7.6333
46	37.6000	31.9222	29.8181	26.1111	24.5555	23.2222	22.0889	21.0889	20.1889	19.3333	18.5333	17.6666	16.8333	15.9500	15.1000	14.3000	9.8500	8.6444	8.4889	7.8333
47	38.3333	32.5111	30.4090	26.6111	25.0555	23.7222	22.5889	21.5889	20.6889	19.8333	19.0333	18.1666	17.3333	16.4500	15.6000	14.8000	10.0500	8.8444	8.6889	8.0333
48	39.0666	33.1000	31.0000	27.1111	25.5555	24.2222	23.0889	22.0889	21.1889	20.3333	19.5333	18.6666	17.8333	16.9500	16.1000	15.3000	10.2500	9.0444	8.8889	8.2333
49	39.8000	33.6888	31.5909	27.6111	26.0555	24.7222	23.5889	22.5889	21.6889	20.8333	20.0333	19.1666	18.3333	17.4500	16.6000	15.8000	10.4500	9.2444	9.0889	8.4333
50	40.5333	34.2777	32.1818	28.1111	26.5555	25.2222	24.0889	23.0889	22.1889	21.3333	20.5333	19.6666	18.8333	17.9500	17.1000	16.3000	10.6500	9.4444	9.2889	8.6333